



Original Research

Motivation of Shoulder Surgery Patients for Rehabilitation

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ABSTRACT

International Journal of Exercise Science 10(2): 234-245, 2017 Motivation can be a valuable construct during physical rehabilitation. Rehabilitation can be uncomfortable and painful, testing patients' rehabilitation motivation and continued participation. Maintaining motivation throughout rehabilitation is important for patients to return to optimal joint motion and daily functioning. The purpose of this research project was to examine rehabilitation motivation after shoulder surgery (rotator cuff repairs, slap repairs, biceps tenodesis, acromioplasty, distal clavicle excision or combination). Persons who underwent shoulder surgery (December 2014 - April 2015) voluntarily participated in the study. The Self Regulation Questionnaire was used to assess patients' self-regulation and motivation. Surveys were administered to participants during rehabilitation at appointments with the physician. This study revealed significant changes to participants' self-regulation throughout the 16-week post shoulder surgical rehabilitation process. Significant increases were discovered when looking at patients' attention to goals and employing strategies to meet those goals. Other main areas of increase included problem solving, planning rehabilitation outside of therapy and coping with challenging times in rehabilitation. Data allows researchers and health care professionals to evaluate the dynamics of motivation fluctuation during rehabilitation. In addition, data will allow researchers to identify areas of motivational concern to implement motivation techniques in order to aid patients through rehabilitation.

KEY WORDS: Self-regulation, therapy, recovery, physical therapy

INTRODUCTION

Participation in a rehabilitation program after orthopedic surgery can be an important part of the recovery process. Rehabilitation is a specific process that guides individuals to reach their full physical, sensory, intellectual, psychological, and social functioning. Rehabilitation allows individuals to work with professionals utilizing various tools needed to return to full function and expand a sense of self-regulation. Self-regulation is described as individual management

of thoughts and behaviors to reach determined goals (4). In order for rehabilitation to be successful, there needs to be a team of rehabilitation specialists including orthopedic surgeons, physical therapists, athletic trainers, family members, and friends working together. Rehabilitation teams can provide guidance, tools, and equipment for a successful recovery. Although rehabilitation is led by an orthopedic surgeon and therapists in clinics, home exercise programs can be initiated if the rehabilitation program does not require specialized types of therapy such as manual therapy. Home rehabilitation programs can provide a quality adjunct to face-to-face in clinic therapy and result in therapeutic gains (12, 13). If patients are ready (physically & psychologically) and able to regulate their own therapy, many therapists prescribe home exercise programs to supplement patients in clinic program and save costs (12, 13).

Adherence to the rehabilitation regimen is a key facet in the outcome of rehabilitation and regaining full function (19). Most rehabilitation protocols include a series of stages (generalized for various shoulder surgeries encompassed in this study). These stages include; a) passive and active assistive range of motion (ROM), b) controlled restoration of assistive ROM and some strengthening in a protected position, and c) full ROM and strength. It is important that patients adhere to the rehabilitation process in order to reap the benefits of the program.

Rehabilitation adherence after orthopedic surgery is affected in multiple ways such as self-motivation and self-regulation (5, 6). Personal and situational factors impacting sports injury rehabilitation were assessed and found that self-motivation and scheduling problems were the main issues impacting rehabilitation motivation (19). Scheduling problems are strongly related to the self-regulation process. Self-regulation can lead to better use of time in order to accomplish tasks and reach determined goals that are meaningful to patients. Planning and scheduling rehabilitation into daily life plays a crucial role in the outcomes of rehabilitation (18). Therefore, individuals are more likely to adhere to a certain rehabilitation regimen if they are internally motivated and make plans to be able to succeed.

Individuals who self-identified as athletes demonstrated greater adherence and had better outcomes after rehabilitation (6). It is reasonable to assume that athletes are prepared for rehabilitation because of previous physical fitness & goal orientation, but more research is needed to confirm such an assertion. In young adults, the drive to be self-motivated to complete their rehabilitation on their own is clearer than in older adults (6). The relationship between the therapist and the patient is more important than age when dealing with adherence to rehabilitation (6). Further therapists can make a conscious effort to build relationships with patients and enhance patient self-regulation during rehabilitation.

Literature on motivation toward and adherence to rehabilitation finds that self-motivation is one of the most important factors in patient success and beneficial outcomes (5). Therefore, the theoretical foundation of this research was the Self-Regulation Theory (SRT). The SRT was developed from constructs of the Social Cognitive Theory (self-efficacy/self-regulation) and helps explain patient motivation towards rehabilitation. The SRT is based on; a) behavior

standards, b) motivation to meet behavior standards, c) monitoring situations/thoughts that accompany breaking behavior standards, and d) willpower/internal strength to control urges (4). Human behavior is regulated by external causes and individuals make decisions based on situations or environments placed before them (2). In actuality, individuals possess self-reflective and self-determinant abilities that enable them to exercise some control over motivation (2). This theory has been used before with health related behaviors and deemed to be appropriate (9).

Through the SRT, motivation can be described as extrinsic and intrinsic depending on how each individual is motivated. Intrinsic motivation is defined as motivation that comes from within an individual and does not rely on external rewards. Patients participate in intrinsic activities because of the personal reward that they receive (22). In the Self-Determination Theory, participation in certain activities can lead to autonomy and competence (10, 15, 22). It can be argued that the most important aspect of self-regulation is autonomy, which can be supported by extrinsic motivation from therapists (16). Therefore, participating in self-motivated activities, individuals can attain greater confidence and willingness to participate along with feelings of joy and excitement. Individuals who demonstrate intrinsic motivation when confronted with rehabilitation barriers have been identified as having positive outcomes (5, 6). In addition, individuals' who adopt higher autonomy, are more likely to complete home rehabilitation, and are more likely to succeed (8). For example, if individuals feel that rehabilitation provides them with a desired outcome and ultimately brings joy to their lives; they may be more willing to complete rehabilitation.

Extrinsic motivation describes how external variables and rewards motivate individuals to participate in rehabilitation or an activity (17). Extrinsic motivation is not only a reward received from the activity, but includes social constructs. Support for autonomy is important when addressing a rehabilitation program. When therapists help patients through rehabilitation, they are more likely to gain or enhance self-regulation (8). Perception of rehabilitation includes social constructs, rehabilitation environment, difficulty of rehabilitation, severity of injury, and feedback from therapists (20, 21). Extrinsic motivation is an important aspect to a rehabilitation program and can be encouraged by therapists to promote participation in therapy.

Rehabilitation is necessary for individuals after an orthopedic injury or surgery in order to maintain and recover to full physical functioning. The process of rehabilitation requires individuals to express some intrinsic motivation in addition to therapists and health professionals providing extrinsic variables to for patients to reinforce and promote rehabilitation motivation. The primary purpose of this study was to measure how patients after shoulder surgery score on the Self-Regulation Questionnaire (SRQ) over time. Furthermore, this study focused on the motivational constructs associated with the SRT. Results from this study would help identify areas of improvement for rehabilitation that would help clinicians and researchers develop tools to maximize patient motivation (intrinsic and extrinsic).

METHODS

Participants

Patients (N = 30) who had arthroscopic shoulder surgery (i.e. rotator cuff repairs, superior labrum repairs, biceps tenodesis, acromioplasty, distal clavicle excision or combination) were recruited to participate (Table 1).

Table 1. Participant demographics.

	n	%	M
Age	24		48.87
Male	16	66.79	
Female	8	33.33	
Surgical History			
Shoulder			
Right	18	75	
Left	6	25	
Previous Shoulder Surgery			
Yes	12	50	
No	12	50	
Same Shoulder Repaired			
Yes	3	12.5	
No	9	37.5	
Previous Physical Therapy			
Yes	3	12.5	
No	9	37.5	
Expect Full Participation in Physical Therapy			
Yes	23	95.8	
No	1	4.2	

Note: M represents mean

Participants were asked to voluntarily participate at their first post-operation appointment. Twenty-four participants (16 males, 8 females, aged 19-74 years) fully participated in the study completing three surveys posts-surgery (during weeks 2, 8, and 16) and fully completed physical therapy that was prescribed by the attending surgeon. Six participants withdrew from the study for varying reasons. Participants that withdrew had less complex surgeries (deemed per physician and physical therapist) and completed their physical therapy prior to week 16; therefore choosing not to complete the study. Participants were informed of the purpose of the study, participation requirements, and expectations prior to consent. Participants all performed their physical therapy with the same protocol prescribed by the same physician who conducted the surgery. Rehabilitation techniques were based on the type of repair performed. The institutional review board at the University of Nebraska at Kearney approved all experimental procedures and tools.

Patients all received the same rehabilitation protocol. Patients were instructed to not do any lifting outside of therapy for 4 months, to wear a sling full time for 2 weeks, and to wear a

sling outside their home 6 weeks post operation. The rehabilitation protocol aimed to increase shoulder ROM, strength, and flexibility. Progressive ROM activities were followed by resistance band strengthening exercises for 16 weeks. At week 16, patients were provided a home program that included full active ROM and gradual return to activities of daily living and work.

Protocol

Collaboration and permission from the attending physician and rehabilitation clinic were obtained prior to data collection. All shoulder patients were recommended to participate in 16 weeks of physical therapy per physician and rehabilitation clinic recommendations. Physician assistants and nurses were both trained how to administer surveys prior to data collection. Researchers participated in the first round of data collection to ensure appropriate administration of the questionnaire. Surveys were given to participants who had shoulder surgery during post-operation appointments. Participants completed the survey at week 2 (W2), week 8 (W8), and week 16 (W16) of the post shoulder surgery. Notes were attached to subject's appointment records to remind nurses and office staff to administer surveys. If participants failed to complete the survey during their appointment, surveys were completed during each patient's physical therapy session of the same visit.

Motivation assessment packets were created and included in each subject's personal medical records. Each packet included a demographic page including information about the shoulder repaired, a medical history report, and the motivation evaluation. Packets were stored and locked in a secure area accessible only to the physician's assistants, nurses and the research investigators. Patients completed demographics, medical history report and the first motivation survey on the first post-surgery appointment. The motivation surveys were conducted at the post-operation appointments according to the schedule.

The Self-Regulation Questionnaire (SRQ)(7) assessed participant motivation based on the self-regulation theory. The SRQ is a seven step model including constructs of *receiving* relevant information, *evaluating* the information, *triggering* change, *searching* for options, *formulating* a plan, *implementing* the plan, and *assessing* the plan's effectiveness. The questionnaire helped investigators answer research questions and helped add to the academic community on rehabilitation motivation. Researchers selected this questionnaire because it measures self-regulation and is easily generalized for a large sample group. The SRQ was shown to be reliable ($r = .94, p < .0001$) when comparing multiple tests taken 48 hours apart (1).

Statistical Analysis

Descriptive statistics were analyzed for study participants including individual means and standard deviations. Self-regulation constructs were analyzed to examine motivation change post shoulder surgery. Paired t-tests were used to examine measured constructs between weeks 2 - 8, weeks 8 - 16, and weeks 2 - 16. Further, repeated measures analyses were used to examine measured constructs over weeks 2, 8, and 16. Individual survey item variability among participants and surgical groups were examined using an analysis of variance (ANOVA). Participants' total scores were analyzed according to the SRQ scoring scale and

model constructs along with individual questions looking at the variability from week to week (7). Data were deemed significant at 0.05. Data were analyzed using the Statistical Package for Social Sciences (SPSS, Version 22).

RESULTS

Over sixty-five percent of participants rated to have high (intact) self-regulation capacity. Further, distribution of capacity categorization was consistent through week(s) 2, 8, and 16 (Table 2).

Table 2. Self-regulation capacity categorization.

	Week 2		Week 8		Week 16	
	n	%	n	%	n	%
High (intact) self-regulation	17	70.8	16	66.7	17	70.8
Intermediate (moderate) self-regulation	6	25	8	33.3	7	29.2
Low (impaired) self-regulation	1	4	0	0	0	0

Pair t-test revealed significant differences between week 2, 8, and 16 among the measured constructs (Table 3). Repeated measures ANOVA revealed significant changes in the measured constructs of receiving [$F(2,24) = 35.59, p = 0.001$], Evaluating [$F(2,24) = 51.95, p = 0.001$], Triggering [$F(2,24) = 24.26, p = 0.001$], and Implementing [$F(2,24) = 13.81, p = 0.001$] (Table 4).

Table 3. Paired t-tests on measured self-regulation constructs between weeks 2, 8, and 16.

		<i>M</i>		<i>p</i>		<i>M</i>		<i>p</i>	
		Week 2	Week 8	Week 2	Week 8	Week 2	Week 8	Week 2	Week 8
Receiving	Week 2	37.16	0.826	Week 2	37.33	0.001**	Week 2	37.16	0.001**
	Week 8	37.33		Week 8	28.04		Week 8	28.04	
Evaluating	Week 2	26.66	0.001**	Week 2	28.91	0.001**	Week 2	26.66	0.001**
	Week 8	28.91		Week 8	35.62		Week 8	35.62	
Triggering	Week 2	34.29	0.862	Week 2	34.41	0.001	Week 2	34.29	0.001**
	Week 8	34.41		Week 8	38.28		Week 8	39.29	
Searching	Week 2	38.29	0.352	Week 2	37.70	0.615	Week 2	38.29	0.304
	Week 8	37.7		Week 8	37.41		Week 8	39.29	
Formulating	Week 2	38.45	0.109	Week 2	37.00	0.028**	Week 2	39.58	0.001**
	Week 8	37.00		Week 8	39.29		Week 8	35.50	
Implementing	Week 2	39.58	0.083	Week 2	38.29	0.002**	Week 2	39.58	0.001**
	Week 8	38.29		Week 8	35.50		Week 8	35.50	
Assessing	Week 2	33.70	0.207	Week 2	34.58	0.038*	Week 2	33.70	0.628
	Week 8	34.58		Week 8	33.25		Week 8	33.25	

Note: *Denotes significance at 0.05; **Denotes significance at 0.01

Repeated measures ANOVA revealed significant increase in self-regulation due to changes in intrinsic and extrinsic motivation among various items between weeks 2, 8, and 16. Participants showed significant change in motivation from week 2 to 16 in SRQ items 14 [$F(1,24) = 4.97, p = 0.04$], 24 [$F(1,24) = 6.45, p = 0.02$], 28 [$F(1,24) = 12.69, p = 0.002$] (Table 5).

Table 4. Repeated measures ANOVA among measured constructs over weeks 2, 8, and 16.

	Week 2		Week 8		Week 16		F (2, 24)	p	η^2
	M	SD	M	SD	M	SD			
Receiving	37.17	3.94	37.33	3.33	28.04	4.29	35.596**	0.001	0.764
Evaluating	26.66	2.56	28.91	3.36	35.62	3.32	51.959**	0.001	0.825
Triggering	34.29	3.30	34.41	3.33	38.29	3.38	24.263**	0.001	0.688
Searching	38.29	3.04	37.70	3.31	37.41	3.43	0.564	0.577	0.049
Formulating	38.45	3.81	37.00	3.81	39.29	3.80	2.739	0.87	0.199
Implementing	39.58	4.33	38.29	3.77	35.55	3.31	13.817**	0.001	0.557
Assessing	33.70	4.02	34.58	3.20	33.25	3.20	3.321	0.055	0.232

Note: *Denotes significance at 0.05; M represents Mean; SD represents Standard deviation

In addition, a repeated measure ANOVA revealed motivation change between weeks 2 to week 8 and 2 to 16 ($p = 0.05$). Statistically significant differences between week 2 and 8 among SRQ questionnaire items 16 (W2 M = 1.46, W8 M = 2.08, $p = 0.03$), 24 (W2 M = 2.38, W8 M = 3.13, $p = 0.01$), and 28 (W2 M = 3.46, W8 M = 4.00, $p = 0.03$). Analyses revealed a significant decrease in question 6 (W2 M = 4.63, W8 M = 4.13, $p = 0.04$) when comparing results from week 2 to 8 (Table 5).

Table 5. SRQ significant items among weeks 2 & 8, weeks 8 & 16, and weeks 2 & 16.

Rehabilitation Motivation			
Week 2 v Week 8	M	SD	p
Implementing (Item 6)	4.63	4.13	0.043*
Evaluating (Item 16)	1.46	2.08	0.032*
Triggering (Item 24)	2.38	3.13	0.013*
Assessing (Item 28)	3.46	4	0.034*
Week 8 v Week 16			
Assessing (Item 49)	4.18	0.62	0.016*
Week 2 v Week 16			
Assessing (Item 14)	3.75	4.33	0.036*
Triggering (Item 24)	2.38	3.08	0.02*
Assessing (Item 28)	3.46	4.13	0.002*
Searching (Item 32)	4.46	4.17	0.05*

Note: *Denotes significance at 0.05; M represents Mean; SD represents Standard deviation

Furthermore, significant differences were identified among SRQ questionnaire items 14 (W2 M = 3.75, W16 M = 4.33, $p = 0.03$), 24 (W2 M = 2.38, W16 M = 3.08, $p = 0.02$), 28 (W2 M = 3.46, W16 M = 4.13, $p = 0.02$), when weeks 2 and 16 were compared (Table 6).

Table 6. SRQ significant items between week 2, 8, and 16 (Repeated Measures Analysis).

Rehabilitation Motivation Item	Week 2		Week 8		Week 16		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Assessing (Item 14)	3.75	0.25	4.04	0.17	4.33	0.17	0.036
Triggering (Item 24)	2.37	0.22	3.13	0.24	3.08	0.26	0.018
Assessing (Item 28)	3.46	0.24	4.00	0.19	4.13	0.14	0.002
Searching (Item 32)	4.46	0.18	4.21	0.19	4.17	0.18	0.05

Note: M represents Mean; SD represents Standard deviation

DISCUSSION

A remarkable finding included over 65% of participants had a combined self-regulation score of 239 categorizing participants as high (intact) self-regulation throughout rehabilitation (See table 2). The distribution of participants' self-regulation categorization suggests that self-regulation steps were met to some extent during through rehabilitation (Table 2) (8).

Self-regulation can be extrinsically or intrinsically motivated, and physicians and physical therapists play an influential role in how well patients are motivated to participate in rehabilitation. Autonomy support is shown to have a positive influence on participants' rehabilitation adherence (8). This is directly related to patient competency, mindfulness, intentions, and thoughtful self-reflection that are being put toward rehabilitation in the current study. Further, data suggests participants adapted presumably by becoming more aware of their physical status during rehabilitation. This can be explained through the paired t-tests and repeated measures ANOVA (*Evaluating* and *Triggering*) analyses, ultimately better preparing patients to recover and complete rehabilitation. Chan et al. reported motivation of patients contributed 28% variance in rehabilitation adherence (8). This, in addition to the current studies' results, describes how important patient motivation should be to physical therapists and physicians during the early stages of treatment.

Further, the magnitude of dependence on therapists and other social support systems can also serve as positive leverage and relate to how patients receive relevant information and search for information. The constructs of *Searching* and *Formulating* were not found to change significantly over the course of rehabilitation. Interestingly, these two constructs were rated higher than all but one construct at week 2 suggesting patients were confident in their ability to search for options and formulate plans to complete rehabilitation. Patient planning and preparation pre-operation can serve as a valuable tool. Patients have different rehabilitation barriers due to individual uniqueness. Even though patients differ, preparatory action can be used to enhance the self-regulation steps (11, 23-26). Physical therapists can enhance motivation and patient self-regulation through autonomous motivation techniques and engage, integrate, and implement goal setting and planning into therapy sessions. Data indicates rating of self-regulation (motivation) varies throughout rehabilitation. Physical therapists' input is needed to change rehabilitation protocol, but with a strong relationship with each patient's therapist can help obtain the highest functioning and allow patients to return to tasks of daily living (6, 14).

Fluctuations in the SRQ seven-step model can result in failure or deficits with individual self-regulation. The current study revealed patients' rating of *Evaluation* significantly increased. This finding is encouraging for therapists as it suggests that patients were able to evaluate their current physical status and compare it to norms. The goal for therapists is to facilitate rehabilitation. It would be helpful for therapists to be prepared to assist patients in becoming more conscious and aware (mindful) of their physical progress. In contrast, the construct of *Implementing* significantly decreased suggesting patients were not implementing the rehabilitation plan set by therapists; however, it also suggests patients were confident in their ability to find alternative ways to incorporate rehabilitation tactics into their activities of daily living resulting in an alteration of the rehabilitation plan. In addition, a significant decrease in rating of *Receiving* occurred between weeks 8 and 16 and rating of *Evaluating* significantly increased between weeks 8 and 16. During the first few weeks of rehabilitation patients are receiving an abundance of information and as rehabilitation prolongs, information transitions to being processed for implementation purposes. This makes the first few weeks of rehabilitation critical for self-regulation step transition as patients progress through rehabilitation.

Practical uses for these findings include therapists focusing on problems that patients will potentially face, planning rehabilitation into patients daily lives outside of the clinic, and coping techniques associated with rehabilitation barriers. These come from the current study where participants increased SRQ scores (items 14, 16, 24, 28), and could be focal points for health professionals to enhance patient motivation. The local rehabilitation clinic, where participants underwent therapy, uses goal setting and positive reinforcement throughout rehabilitation to increase patient success. This is in conjunction with the local rehabilitation clinic and patients know what is expected from the physician and goals are set accordingly. Further, therapists ask how each patients' home program is proceeding including pain, swelling and changes in range of motion which would inhibit progress. This type of patient - therapist interaction is shown to have a positive influence on adherence and motivation (3). Although patients' motivation in our study was high from the beginning, some patients increased their scores each week throughout the study. This was an increase in not only individual item scores, but also gross raw scores, which means that although each item was not significantly different, total motivation and self-regulation increased. The current study yields increases in SRQ scores, which could be an effect of extrinsic motivation from at the clinic (therapists & physicians).

Our study does have limitations. Participants could have misrepresented answers to survey items and rating of personal motivation. This study is reliant on self-report rating of motivation and an unrelated event could have affected/influenced responses. The current studies' sample size did not allow for analysis of differences in surgical procedures, pathology, mechanism (degenerative v. traumatic), and various rehabilitation protocols (type of sling worn and duration used post operation). These variables should be investigated in future research studies.

Although our study was with shoulder surgery patients, all individuals are by nature, motivated and want to succeed, because success is satisfying and rewarding (11). With guidance and focus, therapists across all specialties can have a profound influence on patient motivation through increasing patient self-regulation. This study concludes that through the rehabilitation process, self-regulation increased with time. Patients' self-regulation was built upon and increased over time presumably by rehabilitation-awareness and external impact (therapists). This study advocates for patient-to-therapist interaction and suggests therapists should involve patients and allow them to be "a part" of their recovery. In practice, therapists can use the revised SRQ to gauge patient self-regulation and assess self-regulation steps (1). The scope of this study sought to evaluate self-regulation over 16 weeks of rehabilitation and concludes that multiple constructs consistently increased. Patient motivation can be tricky to gauge and sustain. Self-regulation can be an essential tool for practitioners and results can be used in various contexts affecting behavior change.

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